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REMARKS

Claim rejections under 35 USC 103

Claims 1-30 have been rejected under 35 USC 103(a) as being unpatentable over Wilson (6,718,347) in view of Latif (6,400,730). Applicant respectfully traverses the rejection, as is now specifically described in relation to two groupings of claims.

Claims 1-3, 7-15, and 19-24

Claims 1, 7, and 19 are independent claims, from which claims 2-3, 8-15, and 20-24 ultimately depend. Claims 1, 7, and 19 are claims having substantially the same limitations insofar as patentability over Wilson in view of Latif is concerned. For instance, claim 1 in particular is directed to a system that includes a "means for communicating directly between the first and second hosts using the storage area network protocol *in a non-ESCON protocol manner*," where the italicized text indicates an amendment made to claim 1. Claim 7 has this same limitation but in step or act form, as part of a method. Claim 19 has this same limitation, also in means-plus-function form, but as part of an article for communicating between a first and a second host. Applicant specifically discusses claim 1 as representative of claims 1, 7, and 19. Applicant asserts that as amended, claim 1 is patentable over Wilson in view of Latif, such that claims 2-3, 7-15, and 19-24 are patentable over these references for at least the same reasons.

Applicant provides two independent reasons why claim 1 is patentable over Wilson in view of Latif. First, Wilson in view of Latif does not disclose "means for communicating directly between the first and second hosts using the storage area network protocol." Second, Wilson in view of Latif does not render such communication "in a non-ESCON protocol manner" obvious and unpatentable. Each of these reasons is now described in detail.

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First reason why Wilson in view of Latif does not render claims 1-3, 7-15, 19-24 unpatentable

With respect to the claimed limitation of "means for communicating directly between the first and second hosts using the storage area network protocol," the Examiner has relied upon Wilson in disclosing all aspects of this claimed limitation, except for the storage area network protocol, where the Examiner has relied upon Latif. Applicant concedes that Wilson's ESCON protocol is a type of storage area network protocol, and that Latif discloses other types of storage area network protocols. However, Applicant submits that Wilson does not specifically disclose *direct communication between the first and second hosts using the storage area network protocol*, be it an ESCON protocol or some other type of storage area network protocol.

For example, the Examiner relies upon column 11, lines 15-47, and column 14, lines 12-39 of Wilson in disclosing direct communication between the first and second hosts using a storage area network protocol, where this protocol is specifically an ESCON protocol. However, upon careful study, Applicant believes that these excerpts of Wilson do not actually disclose *direct communication* between first and second hosts *using a storage area network protocol*, where the protocol is an ESCON or other type of storage area network protocol. Column 11, lines 15-47, for instance, specifically discloses the following:

Example implementations of the storage controllers 302a-b are shown in FIG. 6. As shown, each of the storage controllers 302a-b may include a respective controller 604, and a respective ESCON interface unit 602 that interfaces the controller 604 with a channel 501 over a link 502. Together, each controller 604 and its associated ESCON interface unit 602 perform the functions of the control unit 404 (FIG. 4) in the ESCON environment, enabling communication between the processors 104a-b (FIG. 6) and the storage systems 118a-b (FIG. 6), respectively, using the ESCON protocol. Although each of the links 502a-b between the storage controllers 302a-b and their associated channels 501a-b is shown as a single path in FIG. 6, it should be understood each link 502 may include several (e.g., six-eight) parallel communication paths.

In one system implementation wherein the ESCON protocol is used for communication between the processors 104a-b and the storage controllers 302a-b, respectively, the ESCON protocol is also used (for reasons of simplicity) for communication between the storage controllers 302a-b. An example of such an implementation wherein the ESCON protocol is used for communication between

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the storage controllers 302a-b is shown in FIG. 6, wherein the storage controllers 302a-b are provided, respectively, with ESCON interface units 606a-b, and each of the ESCON interface units 606a-b is coupled to the communication path 304.

In embodiments of the invention wherein the ESCON protocol (or a modified version thereof) is used to transfer data from one of the storage devices 306a-b to the other, for any given data transfer, one of the storage controllers 302 acts as a so-called source or master, and the other storage controller 302 acts as a so-called target or slave.

Here's how Applicant interprets this excerpt. The "hosts" disclosed in the claimed invention have to be the servers 100a and 100b in FIG. 6, having the processors 104a and 104b, respectively. Therefore, the question is, does this excerpt of Wilson disclose *direction communication* between the servers 100a/b (or their processors 104a/b) *using a storage area network protocol* (which in Wilson is the ESCON protocol)? The answer is no. Column 11, lines 15-47 discuss how the *processors 104a/b* communicate with the *storage controllers 302a/b* using the ESCON protocol – not with themselves. That is, Wilson discloses how the hosts can communicate with storage systems 118a/118b using a storage area network protocol, *not* how the hosts can directly communicate with one another using a storage area network protocol.

This is an important distinction. The claimed invention relates to two hosts directly communicating with one another using a storage area network protocol, which is novel, since storage area network protocols, like the ESCON protocol, are conventionally used for host-to-storage system communication. Wilson discloses such conventional usage of a storage area network protocol, in that it shows how such a protocol, like the ESCON protocol, can be used for host-to-storage system communication, and not for host-to-host communication, as in the claimed invention.

Indeed, for direct host-to-host communication, Wilson discloses in FIG. 6 a more conventional "network cloud" 114, to which both the hosts 100a/b are connected. Thus, for direct host-to-host communication, it makes sense that Wilson would utilize the conventional network cloud 114, and for host-to-storage system communication, that Wilson would utilize the storage-area network protocol. Therefore, Wilson, and Wilson in view of Latif (since Latif is

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relied upon only to show different types of storage area network protocols) does not disclose the claimed invention. The claimed invention is particular to utilizing a storage-area network protocol for direct host-to-host communication. Wilson, and Wilson in view of Latif, utilize a storage-area network protocol just for host-to-storage system communication, and have a more conventional network 114 for direct host-to-host communication, which is not disclosed as being a storage-area network protocol.

Thus, the point of the claimed invention insofar patentable over Wilson in view of Latif is concerned is that a storage area network protocol is being used for novel direct host-to-host communication, whereas the prior art, such as Wilson in view of Latif, employ such a protocol only for more conventional host-to-storage system communication, and use other types of network topologies for direct host-to-host communication.

The other relied upon excerpt of Wilson, column 14, lines 12-39, similarly discloses standard host-to-storage system communication using a storage-area network protocol, and not the novel direct host-to-host communication using such a storage-area network protocol, as to which the claimed invention is limited. Column 14, lines 12-39, of Wilson disclose the following:

In one embodiment of the present invention, no portion of the communication path 304 disposed between the storage controllers 302a-b (including and interface units 608a-b and the communication channel 610) emulates the channel 402 or control unit 404 in the ESCON environment, or actively participates in the ESCON protocol in any way. Rather, the interface units 608a-b merely interface the storage controllers 302a-b to the particular communication medium used for the application.

In accordance with different embodiments of the invention, different protocols are provided for implementing the interface between two ESCON compatible devices (e.g., the storage controllers 302a-b) over a general purpose transmission medium (e.g., T3). As is explained in detail below, the ESCON compatible devices may communicate over the transmission medium using the standard ESCON protocol. Alternatively, the ESCON protocol may be modified to achieve improved performance.

The ESCON protocol supports a number of different operations between the channel 402 and control unit 404 (FIG. 4). An example of one such operation is discussed herein to illustrate the operation of devices using the ESCON protocol

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and the manner in which the protocol is modified in some embodiments of the invention to improve performance. However, it should be understood that the present invention is not limited to this single operation, and that each of the operations supported by ESCON is implemented in a similar fashion.

Here, too, Wilson does not talk about *hosts*, like servers, communicating directly with one another using a storage-area network protocol, but rather talks about communication between storage systems, having storage controllers 302a/b, communicating with one another using a storage-area network protocol. This makes sense, and is completely conventional. A storage-area network protocol is a protocol designed for storage systems to talk with one another. Wilson, and thus Wilson in view of Latif, uses such a storage-area network protocol in a completely conventional manner, for communication between storage systems. By comparison, the claimed invention uses a *storage*-area network protocol in a novel manner, to instead provide for direct communication between *hosts*, which are not storage systems. Wilson, and Wilson in view of Latif, does not render the claimed invention unpatentable in this respect.

Second reason why Wilson in view of Latif does not render claims 1-3, 7-15, 19-24 unpatentable

The other claimed limitation that Wilson in view of Latif does not render unpatentable is communication in a "non-ESCON protocol manner," to which the claimed invention has been amended. As admitted by the Examiner, Wilson does disclose ESCON communication links, such as in column 10, lines 26-67 thereof. Latif does disclose non-ESCON communication links – i.e., other types of storage area network protocols. Therefore, the question here is, is it an obvious matter of substituting Wilson's ESCON communication links with Latif's non-ESCON communication links to yield this limitation of the claimed invention?

Applicant argues no, that it is not an obvious matter to replace Wilson's ESCON communication links with Latif's non-ESCON communication links. Here's why. ESCON is a very particular kind of storage area network protocol, and it is not an obvious matter of replacing an ESCON communication link with a non-ESCON communication link, as would be required to

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render this aspect of the claimed invention non-patentable over Wilson in view of Latif. Rather, using a non-ESCON communication link provides the claimed invention with certain advantages, and therefore even if a *prima facie* case of obviousness can be made as to this claimed limitation of the invention over Wilson in view of Latif, these advantages provide evidentiary indicia as to why the claimed invention is nevertheless non-patentable in this respect. The patent application as filed describes the ESCON protocol, and why the FICON protocol used by a preferred embodiment of the invention is a very different kind of protocol that provides advantages over the ESCON protocol.

First, in the background of the invention section of the patent application as filed, the ESCON protocol is described.

ESCON (Enterprise Systems Connection) is a fiber-based protocol. The ESCON protocol allows various emulations to run on top of it for further communication with the mainframe either directly or indirectly through ESCON emulators. *However, in order to perform this connectivity, the non-mainframe hosts need a separate ESCON hardware adapter, as well as other limitations.*

ESCON based physical channel speeds are 17 Mbps. ESCON network connectivity is usually accomplished through ESCON directors and hence the distances between the end-hosts are limited. ESCON requires a repeater every 1.86 miles. *This requirement leads to increased costs when the machines or hosts that are to be connected are far apart.*

The italicized portions of this excerpt show some of the hardware limitations that are specific to the ESCON protocol.

Next, the advantages over the prior art section of the patent application, towards the tail end of the detailed description section of the patent application as filed, describes why the FICON protocol used by a preferred embodiment of the invention is a non-trivial difference vis-à-vis the ESCON protocol in that it provides advantages over utilization of the ESCON protocol.

The present invention has an advantage over the prior art in that no special FICON based hardware adapters are required, *unlike ESCON based architecture*, in order to provide end-to-host network connectivity. Instead the FICON based architecture uses standard Fibre Channel adapters. *This allows the SAN infrastructure to be leveraged for physical connectivity needs.* Also, the distance

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between the end-hosts is no longer a limiting factor from a cost perspective because the connectivity can be easily extended at a very reduced price through WAN networks. Since no special hardware other than the standard Fibre Channel hardware adapter is required, *there is a significant reduction in product development or test cycles.* Also there is no additional cost associated with software driver development for the adapter. Ultimately the present invention will result in better time-to-market (TTM) of products, significant cost reductions and greater product flexibility.

The italicized portions of this excerpt show some advantages of the claimed invention in its non-ESCON protocol aspects. Thus, the issues here are the following. First, the ESCON protocol cannot provide for end-to-host network connectivity – i.e., direct host-to-host communication – such that Wilson does not disclose direct host-to-host communication using a storage-area network protocol, regardless of whether or not it is combined with Latif to use different kinds of protocols for its disclose storage system-to-host communication. (This issue pertains more to the first reason for patentability of the claimed invention over Wilson in view of Latif, but Applicant nevertheless divulges it here.)

Second, and most relevant to the aspect of the claimed invention discussed here in relation to the second reason for patentability, even if a *prima facie* case of obviousness can be proffered that Wilson's ESCON protocol can be substituted with Latif's non-ESCON protocols to yield the claimed invention, there still is patentability because the utilization of non-ESCON protocols provides the claimed invention with certain non-obvious advantages, as highlighted in the excerpt from the patent application as filed, above. That is, using a non-ESCON protocol, like FICON, enables the claimed invention to provide for end-to-host network connectivity, which the ESCON protocol itself cannot achieve. Using a non-ESCON protocol allows for leveraging SAN infrastructure for direct host-to-host physical connectivity, as well as a significant reduction in product development.

That is, it may *appear* that substituting Wilson's ESCON protocol for Latif's non-ESCON protocol is a simple "apples for apples" substitution of network protocols. However, even if such a *prima facie* case of obviousness can be made, the evidence of the advantages of using a non-

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ESCON protocol for direct host-to-host connectivity, and the evidence of the fact that substituting a non-ESCON protocol for an ESCON protocol is non-trivial and is not a simple "apples for apples" substitution, act as *Graham* factors otherwise arguing for patentability of the claimed invention. The utilization of a non-ESCON protocol is non-obvious, even if *prima facie* obviousness is proffered.

Claims 4-6, 16-18, and 25-30

Claims 4, 16, and 25 are independent claims, from which claims 5-6, 17-18, and 26-30 ultimately depend. Claims 4, 16, and 25 are claims having substantially the same limitations insofar as patentability over Wilson in view of Latif is concerned. For example, claim 4 in particular is directed to a system for facilitating communications of a first host, including "means for communicating with a *second host* using a storage area network protocol," "in a non-ESCON protocol manner," where the last quoted part indicates an amendment made to claim 4. Claim 16 has this same limitation but in step or act form, as part of a method. Claim 25 has this same limitation, also in means-plus-function form, but as part of an article for communicating with a first host. Applicant specifically discusses claim 4 as representative of claims 4, 16, and 25. Applicant asserts that as amended, claim 4 is patentable over Wilson in view of Latif, such that claims 5-6, 16-18, and 25-30 are patentable over these references for at least the same reasons.

Applicant argues that claim 4 is patentable over Wilson in view of Latif, for the same two reasons that claim 1 is patentable over Wilson in view of Latif, as has been described in detail above. This is because whereas claim 1 approaches direct communication between a first and a second host as a system for such communication, claim 4 approaches the same type of direct communication between first and second hosts from a different perspective, as a system for facilitating the communication of the first host. That is, whereas claim 1's system encompasses the communication between the first and the second hosts, claim 4's system encompasses the communication between the first and the second hosts, too, but from the perspective of a system

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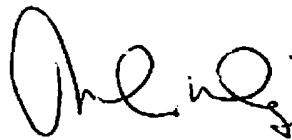
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for facilitating the communications of the first host. Thus, whereas claim 1 includes a means for communicating directly between the first and the second hosts, claim 4 includes a means for communicating with a second host – since the system of claim 4 is directed to being from the perspective of the system for the first host. Put another way, claim 1 encompasses both the first and second hosts, while claim 4 encompasses just the first host – but both claims 1 and 4 talk about direct communication between the first and the second hosts “using a storage network protocol” “in a non-ESCON protocol manner.” For these reasons, claims 1 and 4 are similar insofar as patentability over Wilson in view of Latif is concern, and therefore claim 4 is patentable over Wilson in view of Latif for the reasons that have been discussed in detail in relation to claim 1.

Conclusion

Applicants have made a diligent effort to place the pending claims in condition for allowance, and request that they so be allowed. However, should there remain unresolved issues that require adverse action, it is respectfully requested that the Examiner telephone Mike Dryja, Applicants' Attorney, at 425-427-5094, so that such issues may be resolved as expeditiously as possible. For these reasons, and in view of the above amendments, this application is now considered to be in condition for allowance and such action is earnestly solicited.

Respectfully Submitted,



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